How do we know that a person's use of prescription or OTC medications -

a) may affect their ability to safely operate a motor vehicle ?

b) may contribute to accidents ?

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Data Sources

1) Pharmacological Information

2) Laboratory Studies

3) Driving Studies

4) Epidemiological Studies

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Pharmacological Information

- Primary therapeutic indications
- Known desired effects and adverse effects
- Pharmacology
- Known drug interactions
- Drug manufacturer's recommendations (PDR)

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Laboratory Studies

- Demonstrates whether a drug produces a dose-related impairment of cognitive and psychomotor functions in a laboratory setting

  e.g. divided attention, alertness, reaction time, tracking, visual acuity, risk avoidance, short-term memory, etc

- Do not simultaneously test all of these individual functions

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Driving Studies

Test of actual driving skills

- attempts to duplicate real-life situations
- tests reactions to traffic signals, interactions, decision making, passing and turning, etc

1) Driving Simulator tests

2) On-the-Road Driving tests

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Epidemiology

Incidence / extent of drug use in a population

- DUI cases, fatalities

Actual Case Reports

- evidence of driving impairment

(driving observations, sobriety tests, toxicology)

Responsibility Analysis / Culpability Studies

- provides a risk assessment of the role of a drug
- accounts for road and vehicle conditions, weather, fatigue and medical conditions, other drugs

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Benzodiazepines

Drug Info

alprazolam (Xanax), clonazepam (Klonopin), diazepam (Valium) lorazepam (Ativan), oxazepam (Serax), temazepam (Normison)

- Used as sedative-hypnotics, anti-anxiety, muscle relaxants
- Short and long duration of action
- May cause drowsiness, dizziness, confusion, lethargy, ataxia
- Long-acting benzo's may have residual/hangover effects
- Patients can become tolerant to some effects

- PDR = suggests patients not operate dangerous machinery until they appreciate the effects of the medication, and warns that the drug's effects may be additive to those of alcohol or other CNS depressants

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Benzodiazepines

Laboratory studies

- Single therapeutic doses are capable of impairing cognitive and motor performance
- Some development of tolerance with chronic use
- Effects of alcohol + CNS depressants are additive

Driving studies

- Significant impairment of (e.g.) lateral position control, visual perception, speed control, anticipation of hazards

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Benzodiazepines

Epidemiology studies

- Most frequently detected prescription drug found in divers (although overall % quite low)
- Drivers often uncoordinated, disoriented, drowsy, drunk-like, slurred speech

Responsibility Analysis

- Study results often inconsistent due to different drugs, doses, duration of effects, tolerance
- Overall, benzodiazepine use approximately doubles the risk of an accident
- Effects are dose-related, and higher in elderly

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Zolpidem (Ambien®)

Drug Info

- Treat insomnia; sedative-hypnotic; CNS depressant
- Dose 5-10mg; peak concentration at 1.5 hr
- May cause drowsiness, dizziness, fatigue, ataxia, lethargy, anxiety
- PDR = caution against activities requiring complete mental alertness or motor co-ordination ... combined use of other CNS depressants/alcohol may cause additive effects

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Zolpidem

Laboratory studies

- Single hypnotic doses likely to cause significant impairment of psychomotor skills for the first 4-5 hr
- Additive effects with Alcohol
- No significant morning-after effects

Driving studies

- Tested 10-12 hr post 10 mg dose – no significant adverse effects

Epidemiology studies

- Incidence very low (< 1%)
- DUI cases – erratic driving, slurred speech, slow movements, confusion, disorientation, poor balance + coordination, amnesia

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